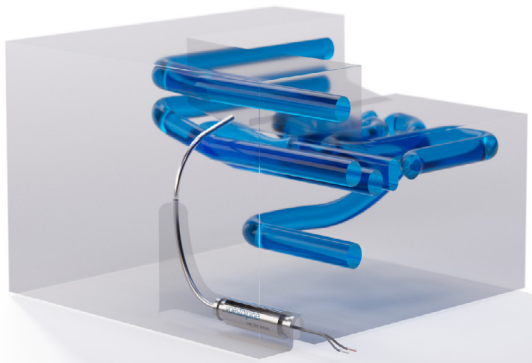

PLASTICS

voestalpine SENSORIZED INSERTS designed for pure performance

Sensorized inserts are used in plastic injection molding, where precise process control and monitoring is required to ensure consistently high part quality.

YOUR ADDED VALUE

With rising demands for higher part quality, the need for effective process monitoring is increasing. For precise quality monitoring and process control, temperature sensors must be placed at critical points. However, practical constraints like limited accessibility and space due to cooling channels or ejectors often force compromises. This can result in reduced process insights, even with advanced measurement technology.

voestalpine Sensorized Inserts overcome these limitations by enabling the seamless integration of internal channels for sensor placement via additive manufacturing. Using our integration know-how, small diameter channels can be realised with precise positioning up to 0.5 mm from the cavity. This approach allows precise process monitoring at critical areas without sacrificing cooling performance.

Utilizing the design freedom of additive manufacturing, sensors can be optimally positioned between cooling channels and the cavity wall, eliminating the need for additional drilling efforts. Moreover, conventional thermocouples offer a cost-effective alternative, as they can be installed directly into the mold insert.

CUSTOMER BENEFITS

- **Precise process monitoring due to exact positioning close to the cavity wall or cooling channels**
- **Highly flexible positioning of thermocouple due to three-dimensional channel layout**
- **Easy integration of different temperature sensor types and flexible, application-specific fixture**
- **No impairment of the cooling channel layout due to the design freedom of additive manufacturing**

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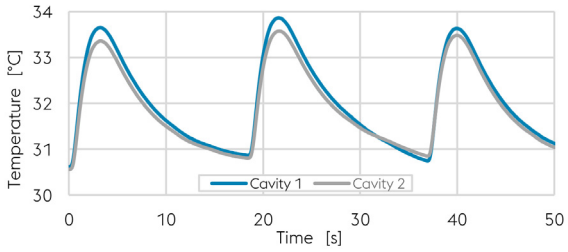
USE CASES

PROCESS MONITORING - CAVITY TEMPERATURE

Process monitoring is used to save time in process set-up and to monitor critical part features, ensuring consistently high part quality. With voestalpine Sensorized Inserts the cavity-wall temperature profile of multi-cavity molds can be monitored.

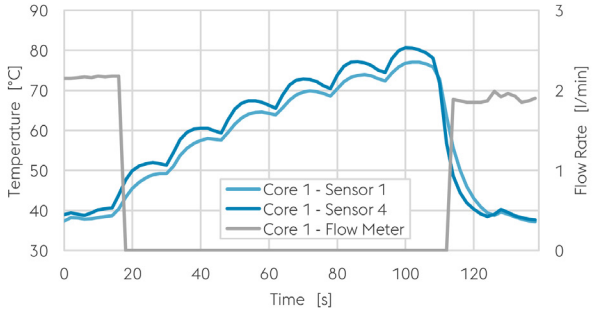
» Save time when setting-up new molds and processes
» Monitoring process stability to increase part quality



PROCESS MONITORING - BLOCKED COOLING CHANNEL

The blockage of cooling channels in a multi-cavity tool can lead to increased scrap rates. Its detection via the flow meter is delayed, and without additional investigations, it is not possible to predict which cavities are affected. Compared to the flow rate decrease, the temperature increase in the cooling channels is instantly detected, allowing allocation to the specific channel.

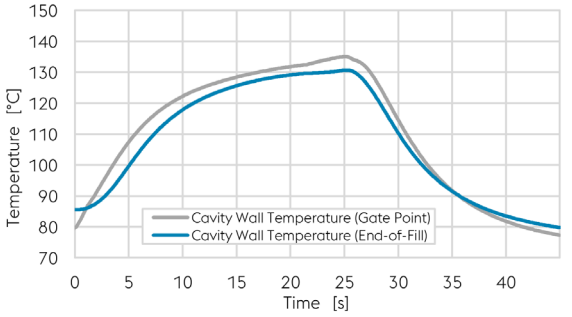
» Detect cooling blockage within one shot
» Reduce scrap rate

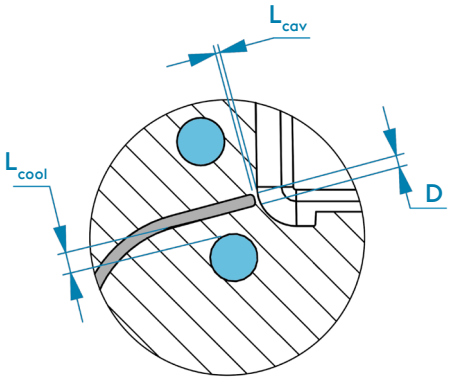


SWITCHOVER FOR VARIOTHERMAL PROCESSES

The set-up and optimization of variothermal injection molding processes is time-consuming and unstable due to process conditions. Thus, the switch-over between heating and cooling can be reproduced using a temperature sensor at the quality-determining points, e.g., flow lines, without negatively affecting the cooling channel layout.

» Increase energy efficiency of variothermal process
» Gather data for process optimization





Main Properties	
Sensor types	e.g., thermocouples of Type K and Type J (sheath D > 1 mm)
Channel diameter	D > 1.5 mm
Fixture	Patented 3D ThermoWeld® solution or mechanical fixing
Distance to cavity	L_{cav} > 0.5 mm
Distance to cooling channel	L_{cool} > 1.5 mm

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